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ABSTRACT

This paper examines some basic principles of learning theory that have been developed within the discipline of psychology. A brief resume of the psychologist's efforts to analyze the phenomenon of learning within a scientific setting is presented as well as attempts to apply this research to a practical situation (e.g. the classroom). More specifically, connections between the theory of learning and applications within an educational setting are introduced. This report is limited because the literature on learning theory with numerous sophisticated intricate theories and counter theories is much too complex and technical for a detailed analysis. Only the most significant theories of learning are discussed in terms of their contribution to the educational environment. (Author)

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The Psychology of Learning:
Theory and Applications for Educators

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HISTORICAL DEVELOPMENT OF LEARNING THEORY

It has been said that psychology may not be the oldest profession, but surely it was the earliest hobby (Rietman, 1970). Most individuals turn amateur psychologist, pure or applied, at sometime in their lives. The problem for the psychologist has been to organize research findings and make applications in the field. One primary criterion of academic legitimacy is research with sound empirical data. Psychology became a science when an experimental approach was adopted. The measurement of learning requires dependable observations of performance (Kingsley, 1970).

Etymologically the very word psychology means the study of the soul, and Aristotle's concept of the soul was a cornerstone in psychology for centuries. Aristotle's notion of the soul was directly related to man's sensory powers. Aristotle formulated certain laws of association and distinguished association by similarity, by contrast, and continuity (Kingsley, 1970). John Locke is often referred to as the founder of modern psychology because of his attempts to apply empirical methods to the study of the human mind. William James has been given credit for stimulation of American psychology, and Edward L. Thorndike has been referred to as the father of educational psychology (Kolesnick, 1970). The significance and acceptance of modern psychology has been based upon research and laboratory experimentation.

From a practical point of view the basic problem of psychology is the problem of learning. Learning is an activity that engages a major portion of every individual's life. An organism develops and learns to adapt in various ways. How this adaption and adjustment takes place concerns the psychologist. We learn many things: attitudes, fears, gestures, motor skills, and language skills. The process is so important to the successful survival of human beings that the institution of education has been devised. Learning is a fundamental

process of life, and schools attempt to make the process more efficient (Kingsley, 1970).

Kingsley (1970) said that learning is the process by which an organism, in satisfying its motivations, adapts or adjusts its behavior in order to reach a goal. Hilgard (1966) said learning is the process by which an activity originates or is changed through reactions to an encountered situation, provided that the characteristics of the change in activity cannot be explained on the basis of native response tendencies. Both of these definitions are perhaps in need of qualifications to make them formally satisfactory. From the point of view of the learning theorist a number of questions would need to be answered before applying these definitions to the laboratory. Kaplan (1964) commented that "every term directs a beam of light onto the screen of experience, but whatever it is we wish to illuminate, something else must be left in shadow. Vagueness has never been better characterized than as the penumbra of meaning" (p. 66).

Hill is somewhat philosophical in his comments on learning theory.

All interpretations of learning are to some extent theoretical. No matter how hard one tries to stick to the facts he is bound to select certain facts at the expense of others and to generalize beyond his evidence, and he is very likely to talk about processes that he cannot directly observe (Hill, 1963, p. 203).

Furthermore, Hill believes that for the most part, exact predictions made by learning psychologists are applicable only to carefully controlled laboratory conditions. Rarely can predictions be made regarding the complex, uncontrolled conditions of everyday life. Yet, there are a number of specialists engaged in learning theory, and attempts are made to apply scientific laws to the complexities of human behavior. Most certainly this is a difficult task, made more complex, because learning theorists themselves do not agree with each other when analyzing their data.

An example of the differences among learning theorists is recalled by Howard Kendler (1965). Thorndike in 1898, Muenzinger in 1928, Adams in 1929, and Guthrie and Horton in 1946 all reported behavior of animals in a problem box situation. It is interesting to note that their respective answers to the questions "what is learned" appear to be at variance. Thorndike, Guthrie, and Horton concluded that stimulus-response associations were learned, although disagreeing to some extent about the conceptual properties of the association. On the other hand Muenzinger and Adams interpret their data to support the conception that "ideas" or "meanings" were acquired (concepts relating to the modern cognitive map theory). Careful readings of these experimental reports suggest the experimenters were observing similar behavior patterns of their subjects (Kendler, 1965).

Indeed there are questionable results from the laboratory, so how can these theories be put to practical use? One prominent group of learning theorists candidly admitted the only people who have received practical benefits from learning theory are the learning theorists themselves. They can, if they wish, make rather good professional careers out of attacking the weak points in one another's theories, (Adams, et al. 1954, p. 129). There is no likelihood that any congress of learning psychologists would produce the same list of learning principles (Bugleski, 1956). Indeed, Kingsley states that no single theory is able to explain all aspects of learning.

Winfred F. Hill (1963) attempts to explain what learning is. First, it is an approach to the area of knowledge, a way of analyzing and talking about and doing research on learning. Second, a theory of learning is an attempt to summarize a large amount of knowledge about the laws of learning in a fairly small space. Third, a theory of learning is a creative attempt to explain what learning is and why it works as it does. This definition indicates the scientific

emphasis by mentioning the "laws of learning". Unlike the physical sciences, human beings are not completely predictable and laws of learning cannot be used as Boyle's Law relating gas pressure to volume. Predictive statements concerning human behavior are subject to complex variables and turn out to be statements of probability at best. Even the laws of nature as Thomas Kuhn (1970) observes, are erodable when man is willing to challenge a particular paradigm. However, this is dangerous, because it destroys existing relationships and the security of those attached to the relationships.

Historically the psychology of learning has two immediate roots. One is Ebbinghaus' book on Memory (1885). The process of memorization is one of the oldest and most common techniques used in studying the learning process (Davis, 1966). The second source came from Pavlov's work on conditioning. The experimental paradigm which Pavlov introduced is called classical conditioning (Kintsch, 1970). Psychology's claim to the field of learning theory has been staked out by Ebbinghaus (1885), Bryan (1897), Harter (1899) and Thorndike (1898). Bugelski (1964) said the science of psychology has developed around the stimulus-response formula in one modification or another. Organisms are presumed to react in certain ways, because they are stimulated to do so. In 1813 John B. Watson organized a school of psychology known as behaviorism which strengthened the scientific approach. Behaviorists have in common the conviction that a science of psychology must be based upon observable physical stimuli. Since they do not use introspection, behaviorists have tended to prefer experimentation on lower animals and infants (Hilgard, 1966).

Kingsley (1957) said that theories of learning fall into two main groups, those classified as cognitive theories and those classified as associative theories. Cognitive theories stress changes in cognition or the learner's per-

ception. Association theories deal with the association of a response to a particular stimuli and the change within the learner himself. The stimulus-response psychology of learning sees in any activity first, a situation which influences or affects the individual, second, a response the individual makes to the situation, and third, a connection between the situation and the response. This connection is called the S-R bond. Cognitive theory stresses the concept that learning is a process of discovery and understanding relationships, and of organizing and finding significance in the sensory experiences aroused by the external situation. Cognitive theorists oppose diametrically the associationist (Kingsley, 1957).

Hilgard (1966) also explains that learning theories fall into two major families: stimulus-response and cognitive theories, but not all theories belong to these two families. The stimulus-response theories include such diverse members as Thorndike, Pavlov, Guthrie, Skinner, and Hill. The cognitive theories include Tolman and the classical gestalt psychologists. Learning to Gestalt-field theorist is a process of gaining or changing insights, outlooks or thought patterns. The person, environment, and interaction with his environment all occurring at once is the meaning of "field" (Bigge, 1964). The following rough historical summation of learning theory has been developed by Bigge (1964).

Learning Theory

Key Individuals

Mental Discipline (exercised faculties)	John Calvin and Augustine
Mental Discipline (mind substance)	Plato and Aristotle
Natural Unfoldment	Rousseau and Froebel
Appreception	J.F. Hebart and E.B. Titchener
Stimulus-Response Bond	E.L. Thorndike
Conditioning (without reinforcement)	J.B. Watson
Reinforcement and Condition	C.L. Hill (later B.F. Skinner)
Insight	M. Wertheimer and K. Koffka
Goal Insight	B.H. Bode
Cognitive-field	Lewin, Tolman and Bruner

Not completely classifiable in these terms are theories of functionalism, psychodynamics, and the probabilistic theories of model builders (Hilgard, 1966).

Learning theorists in the past have been largely concerned with problems of animal conditioning. Beginning with the twentieth century Thorndike and Pavlov did experiments on animal learning. Thorndike came up with theories on trial and error learning. Pavlov studied responses to various stimuli. The study of conditioning originated with Pavlov, who perceived that the salivation which occurs in response to food can also be elicited by a different stimulus, such as a bell --- a conditioned response. Most studies of animal conditioning are concerned with problems which are not directly relevant to the study of human learning. Animal conditioning experiments are often addressed to motivational problems rather than to learning per se. The concept of reinforcement is central to the research on animal learning, yet reinforcement in human learning is not a matter of an automatic strengthening of the response (Kintsch, 1970). The most characteristic form of learning of both lower animals and man was identi-

fied by Thorndike as trial-and-error learning, or as he preferred to call it later, learning by selecting and connecting (Hilgard, 1966). The significance of animal conditioning may be somewhat removed from practical classroom applications. We know under what conditions a rat can be gotten to learn a maze or how to make a pigeon peck at a desired rate. Rats can be made to run back and forth in an alley, dogs can be taught to roll over, chickens to walk tightropes. Psychologists are interested in this activity, but the general public is more interested in how to educate their children to be successful or to be good citizens (Bugelski, 1956).

Skills and habits, knowledge and understanding, problem solving and learning skill along with attitudes, ideas and values are types of learning outcomes that have been referred to as educational objectives. The main types of learning fostered in schools are: motor skills, perception, rote learning, comprehension, problem solving, motives and attitudes (Kingsley, 1957). There have been attempts to make practical applications from the learning theory laboratory. Thorpe and Schmuller (1953) have developed five so-called practical learning principles:

(1) Motivation:

Learning proceeds most effectively and tends to be most permanent when the learner is motivated, that is, when he has a stake as it were in the activity being undertaken;

(2) Adjustment to maturation level:

Learning proceeds most rapidly and tends to be most permanent where the activity involved is geared to the learner's physical and intellectual ability to perform that activity;

(3) Pattern learning:

Learning proceeds most effectively and tends to be most permanent when the learner is provided with the opportunity of perceiving meaningful relationships among the elements of the goal toward which he is working;

(4) Evaluation of progress:

Learning goes forward with relatively greater effectiveness when the learner is provided with some criterion for indicating specifically what progress he is making;

(5) Broad integrated development:

Learning is facilitated when it goes forward under conditions in which the learner also experiences satisfactory personality adjustment and social growth.

Although these principles are general, they do provide rough guides for the classroom teacher and as such can be considered contributions for education.

LEARNING THEORY IN THE CLASSROOM

The long-range question for the educational researcher is the immediate task for the instructor; how does one best use the principles of learning, motivation, and personal development for the maximum educational benefits to students? Formal learning theory does not lend itself easily to off-the-shelf application. It is difficult to bridge the gap between the laboratory and the classroom. "The learning researcher uses his rats or nonsense syllables or conditioned responses in a highly reductionistic analysis of behavior change; he sacrifices complexity for rigor (Erickson, 1970)". Psychologists who are most active in formulating theories are reluctant to extend their applications to situations other than those in which they are developed (Spence, 1959). B.J. Underwood (1959) suggests that much of what has been discovered in laboratory settings is inapplicable to the classroom because of gross differences in the possibilities for controlling the two situations. The classroom is indeed a complex environment with people from different cultural backgrounds, interests and abilities, attempting, in most cases to conform to the instructor's notions of what is important. Teaching is but one of a number of variables affecting learning (Jones, 1967).

Kingsley (1957) claims that our success in accomplishing the purpose of organized education depends primarily upon the learning that takes place in the classroom under the directions of the teacher. This may be difficult to document. The classroom needs students for learning to take place, but the student does not require a classroom to learn. Clark E. Hummel (1972) has reported on two methods of instruction--traditional teacher-directed versus student self-directed study in a psychology course. The control group met classes and had lectures; the others studied in an independent learning center with no personal teacher contact. The self-directed group did much better than the teacher-directed group. Melton (1964) says the most certain conclusion that one can reach about traditional learning categories is that they are not the proper categories for use in understanding human learning. Perhaps there can be a danger in putting too much emphasis on learning theories.

J.B. Watson (1930) made extravagant claims for psychology saying he could take any healthy infant and guarantee to make him any type of specialist he selected --- doctor, lawyer or artist regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. These boosts for psychology attracted the attention of many interest groups. Carl Rogers in signaling a warning to the public identifies the achievements of psychologists in manipulating humans.

We know how to change the opinions of an individual in a selected direction, without his ever becoming aware of the stimuli which changed his opinion. A static expressionless portrait of a man was flashed on a screen by Smith, Spence, and Klein. They requested their subjects to note how the expression of the picture changes. Then they intermittently flashed the words "angry" on the screen, at exposures so brief that the subjects were completely unaware of having seen the word. They tended, however, to see the face becoming more angry. When the word "happy" was flashed on the screen in similar fashion, the viewer tended to see

the face as becoming happy. There are a number of controls and predictions that can be made on people-- we know how to provide psychological conditions which will produce vivid hallucinations and other abnormal reactions in the thoroughly normal individual in the waking state. (Rogers, 1964, p. 12).

Rogers has recalled only a few of the controls claimed by psychology. B.F. Skinner (1965) says there is enough current knowledge in the behavior sciences, plus that which the future will bring, to enable man to specify the kind of behavioral and personality results he wishes to achieve.

One of the theoretical positions of progressive educational thought is to pick the student up from the point he or she enters the classroom and develop them. Erickson (1970) claims a central task of the instructor will be to direct the learning and thinking of each student along lines that are consistent and compatible with the motivational profile they bring to class. Motives carry the important function of screening either in or out the kind of ideas that the student incorporates into his thinking, his aspirations, and his actions. Too often the educational institution does nothing more than reinforce negative opinions the individual already has about himself or herself. William Moore, Jr. claims he was a high-risk student. According to all the evaluative predictors he should never have gotten a college education--his aunt told him he would never finish college; the high school counselor said he would not get to college; the college advisor said he was not the master's degree material; and his friends told him the Ph.D. was out of the question. Moore earned the Ph.D.

Students are not students per se, that is logical and rational learners. They are people with feelings, ambitions and anxieties. An appreciation of these dynamic social and personal factors are important in shaping the educational achievement of students. Outside-of-class experiences of students with their families, their peers, the work environment and the community are dominant influences in shaping educational plans and aspirations (Erickson, 1970). Robert S. Lynd (1967) says the process of learning in our culture is a melange of somewhat

fortuitous fixations and chance conditioning, erratically guided by institutional pressures, by sympathy, by the projection of other's hopes and by suggestions of those we fear or love. The complexities of the human environment must be understood when applying learning theories.

Learning theory does not provide teachers with specific information on how to teach. Theories of learning deal with the way in which an organism learns. Theories of instruction deal with the ways in which a person influences an organism to learn (Jones, 1967). There are many ways one can manipulate another individual, some aid learning and some do not. Knowing what has worked in the past is no guarantee of what will work in the future for various classroom situations. The teacher is just one of many variables in the teaching-learning process. Bugelski (1964) says learning psychologists continually emphasize:

- (1) Education must have a goal
- (2) Education takes time
- (3) Education calls for equipment
- (4) Education is an individual matter
- (5) Education must be based on an adequate appreciation of stimulus-response variables
- (6) Education must be programmed

Jerome Bruner (1963) says learning a subject seems to involve three almost simultaneous processes. First, there is acquisition of new information. Second, there is transformation --- the process of manipulating knowledge to make it fit new tasks. A third aspect is evaluation --- checking whether the way we have manipulated information is adequate to the task.

The process of evaluation is an integral part of education, but failure is not instructive in any educational sense. Failure does not facilitate constructive and personally meaningful learning. It often prevents constructive learning from

taking place, and often destroys the very individual who most desperately needs satisfying educational experiences (Lembo, 1971). It is generally found among learning theorists that positive reinforcement is preferred to negative reinforcements (Hilgard, 1966). While the reinforcement function calls for the manipulation of rewards and other devices calculated to reduce anxiety, instructors frequently resort to punishment, criticism, and other forms of abuse when appropriate behavior does not emerge. The wise instructor will use a variety of techniques to help students achieve the desired instructional outcomes.

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